REMARKS FOR ADMINISTRATOR BOLDEN

ROYAL AERONAUTICAL SOCIETY

June 18, 2015

Thank you all for inviting me and for giving me the honor of becoming a fellow of the Royal Aeronautical Society. For a kid from South Carolina who didn't even decide he wanted to be a pilot until fairly late in the game, it's a great honor.

You know, once I had the aviation bug, it bit me good. I have to say I love aircraft of all sorts. I love flying over Earth and it was one of the greatest thrills of my life to pilot a vehicle in space. It's a great privilege now to lead our NASA team, whose first "A" – the big "A" – is dedicated to advancements in aeronautics and making the air traffic system around the world safer, greener and more efficient.

My colleagues and I have been able to experience a lot of that system on this trip, having been to France and Italy before arriving here. There are still many improvements to be made, but in a lot of ways things are vastly better as compared to previous decades. It's a matter of perspective.

When I was here last fall, I spoke to you about what NASA was doing and what we planned to do and I have some updates for you because we've been very busy since then.

I want to first thank the President of the Royal Aeronautical Society, Martin Broadhurst, for affording me this opportunity to join you. I also want to commend this organization for nearly 150 years of remarkable leadership, service and advocacy on behalf of the global aerospace community.

Thanks also to the David Parker and your *(his)* team at the UK Space Agency for your *(their)* long-standing partnership with NASA on planetary exploration and on so many other critical missions.

As NASA continues to make major strides in an unprecedented human journey to Mars, we are pleased that so much of the international community is in agreement about "the strategic choices" for space in the 21st century.

It is my belief that we are entering the golden age of global cooperation in space exploration. As I have said many times, the success of our modern space programs will be judged in large part on how well we continue to make space exploration about global partnership – particularly since it is clear that no one nation can do it alone and that the benefits to be gained are for all of humanity.

We've all come a long way since 1866 when this organization was founded and focused on balloons and gliders and heavier than air flight was a serious engineering problem.

The Wright Brothers' famous first flight occurred in 1903, but it wasn't until 1915 that we formed the National Advisory Committee for Aeronautics (NACA), whose centennial we just celebrated in the U.S.

This organization was NASA's predecessor and research by the NACA's engineers at its world-class laboratories and wind tunnels across America led to fundamental advances in aeronautics that supported victory by Allied forces in World War II, propelled supersonic flight and laid the foundation for what was to come with the Space Age when the NACA became NASA in 1958.

Of course, aeronautics is still critical to NASA's mission. We like to say that 'NASA is with you when you fly', because technologies we've worked on are in virtually every aircraft and every control tower worldwide. Likewise, the United Kingdom has made significant contributions to the world aviation community that include Frank Whittle's design of an early jet engine in 1930, the first flight in 1967 of the vertical/short takeoff and landing *Harrier* jump jet as well as the West's first commercial supersonic airliner, the *Concorde*.

Together with our international partners, NASA remains committed to transforming global aviation by dramatically reducing its environmental impact, maintaining safety in more crowded skies and paving the way toward revolutionary aircraft shapes and propulsion systems.

We've developed a strategic vision that focuses our Aeronautics research efforts to best contribute to the nations' future societal and economic needs. We've defined six strategic focus areas comprising:

- Safe, efficient growth in global operations
- Innovation in commercial supersonic aircraft
- Ultra-efficient commercial vehicles
- Transition to low-carbon propulsion
- Real-time, system-wide safety assurance and
- Autonomy

We just completed flying two NASA experiments on our Boeing partner's ecoDemonstrator 757 platform – both designed to improve air flow over the surfaces and ultimately reduce drag, reduce fuel consumption and pollution.

One, active flow control, includes 31 small devices that blew jets of air on the vertical tail to increase air flow, reduce turbulence on the tail, enhance its horizontal component and, perhaps some day, reduce its size. There is some hope that it may eliminate the need for a vertical tail all together. The other involved non-stick coatings applied to the leading edge of the wings to help repel bugs and reduce drag.

We're conducting complex technology demonstrations with the Federal Aviation Administrator and airline partners to test an integrated suite of technologies that make it possible for more aircraft to arrive safely and on time, in the same period of time, during high traffic periods. Over the last three years we have transitioned four tools to the FAA, which will be integrated, into our air traffic management system.

We're also developing decision support tools to help flight controllers keep aircraft separated, maintain throughput and provide efficient flight paths.

At the same time we remain focused on our future in space. Building on the legacy of NASA's historic achievements in space, from the Apollo moon landings to launching the Hubble Space Telescope 25 years ago, our sights are now set on a journey to Mars and we won't get there without the help of our partners in Europe and around the world.

While robotic explorers have studied the Red Planet for more than 40 years, our journey for the human exploration of Mars begins in Low Earth Orbit aboard the International Space Station (ISS) where astronauts from several nations at any given time are helping us learn how to live and work in space for extended periods of time.

American astronaut Scott Kelly and cosmonaut Mikhail Kornienko are now well into their historic one-year mission aboard the Station, which will provide valuable data about living and working in space for the long term.

Our journey continues in many other areas with the arrival next month of the *New Horizons* spacecraft at Pluto after a journey of nine years and more than three billion miles. That's pretty incredible – from a several foot flight of a glider at Kitty Hawk to a journey to the edge of the solar system. But we're not stopping there!

We launched five Earth science missions over the past year, the latest of which, Soil Moisture Active Passive *(SMAP)* is going to help us track soil moisture on a global scale.

Climate change is THE challenge of our generation and we'll continue to make Earth observation on many levels a priority to provide the data we need to understand our planet and its changes.

The James Webb Space Telescope launches in 2018, to a spot about a 1.6 million kilometers from Earth where it will peer beyond our solar system to other galaxies and observe phenomena such as the oldest light in the universe and even the atmospheric makeup of some of the newly discovered exoplanets circling distant stars in other galaxies.

Since I last spoke to you, our *Orion* crew module had its first flight into space, traveling to an altitude of 5800 KM (3600 miles) – farther than any spacecraft designed to carry humans has flown in more than 40 years. It performed spectacularly and is now back at NASA where we're studying it and its systems intently.

The Space Launch System rocket that will eventually carry it continues to move ahead and we just had a test in Mississippi of the RS-25 engines that will power its core stage.

The key to success for all our efforts in aviation and space is found in the cooperation between NASA and our international partners, including the UK Space Agency. In a world rife with geopolitical conflict and uncertainty, these steps taken together in space are a clear demonstration of the benefits to humankind that can be achieved through peaceful global cooperation.

That spirit of international cooperation is what will propel us to Mars, because it is clear that no one nation can do it alone and the benefits to be gained will be for all of humanity – because Mars matters; because our home planet most definitely matters; because the ways we travel across our globe matter and the inspiration that all of this provides to future generations matters.

I've met a lot of students on this trip and let me tell you, they are very excited about the things our generation has accomplished on which they're going to build their own milestones.

They're the ones who have not lived in a time when humans were not exploring space. They're the ones who are actually going to travel to Mars.

I think we can all agree that beyond the scientific and economic benefits of launching into space – of literally leaving this planet – there is something intrinsically unifying about humankind's exploration of the heavens.

The partnerships we have forged are going to give more people around the world the opportunity to experience the wonder and exhilaration of spaceflight.

Through our collaboration and cooperation, many more people will be able to realize the dream of leaving Earth – if only for a short time to float above Earth in microgravity and to see the stars and the majestic tapestry of the Milky Way unobstructed by the artificial lights and dust of our atmosphere. These citizen space travelers will also help us imagine and realize new benefits that can be brought back to Earth.

We are grateful for the strong collaboration between NASA, the UK Space Agency and European Space Agency in human space flight, our exploration of Mars and many other planetary and Earth science missions. Both of our countries understand that space exploration is important for every nation on Earth and can only be achieved through international cooperation.

The future of space exploration is bright, but it will be up to all of us in this assembly to continue working together on this great adventure. At NASA, we're embarked on an incredible human journey deeper into our solar system than ever before. I fervently hope that you in the Royal Aeronautical Society as well as all the citizens of the UK will join us and celebrate the accomplishment of each new milestone. If we do this together, I am confident we will improve life on Earth and transform our shared vision of space exploration into a shared reality of unlimited discovery.

Thank you.